

NYASALAND PROTECTORATE

Annual Report of the
DEPARTMENT of AGRICULTURE
for the Calendar Year, 1924.



Printed and Published by
THE GOVERNMENT PRINTER, ZOMBA.

1925.

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THE DEPARTMENT OF AGRICULTURE,

ZOMBA,

NYASALAND PROTECTORATE,

11th April, 1925.

Sir,

I have the honour to submit herewith for the information of His Excellency the Governor the Annual Report of the Department of Agriculture for the calendar year 1924.

I have the honour to be,

Sir,

Your obedient Servant,

E. W. DAVY,

Acting Director of Agriculture.

The Honourable

The Chief Secretary to the Government,

Zomba.

EUROPEAN AGRICULTURE.

The general position of European Agriculture is revealed in detail in Appendix I, compiled from returns submitted by European planters under the terms of the Agricultural Statistics Ordinance.

The acreage of the major crops in comparison with the previous year and with the previous decade is as follows:—

Crop.	1914.	1923.	1924.
Coffee	1,559	474	424
Cotton	24,006	20,948	26,120
Fibres	820	2,763	5,902
Rubber	5,936	1,812	1,795
Tea	3,338	4,235	5,093
Tobacco	9,042	17,308	20,590

Cotton.—Market prices continued to be satisfactory from the growers point of view, and the average yield was better than in the previous year though still far too low. The most satisfactory results were obtained on the Lower River, principally in the Chikwawa district. In the Shire Highlands an adverse climatic factor was the late onset of rains, it having been the general experience that best results accrue from a crop which is established before the end of November, and which experiences a relatively dry March and April. When rains become general only toward the end of December a valuable portion of the growing season has been lost both as regards air and soil temperatures. The incidence of bollworm attack was generally less than in previous years, and this may be attributed largely to the prolonged dry heat before planting became possible. In some cases however the attack was very severe. A large amount of boll-rot and stained cotton was noted. This was in some cases definitely traced to a fungoid organism which has also been isolated in the West Indies and elsewhere. The disease is only established by certain insects allied to and including stainers which, in piercing bolls to obtain food, introduce the fungus. Remedial measures have therefore to be hoped for from Entomological research. The disease has been in existence in Nyasaland for years but had not previously been associated with the particular fungus. In the past year specimens were noted from the Shire Highlands, Port Herald and Karonga. In all probability 90% of our boll-rot and stained cotton results from this insect-conveyed fungus. The continual cropping of land with or without any rotation, and without fertilizer, is bound to affect the growth of the plant adversely and render it less resistant to the attacks of both insect and fungus, and it is possible that the quickest cure will be obtained by a starvation period, otherwise cessation of cotton growing for one or more seasons.

The regulations for uprooting and destruction of cotton bushes were enforced as in the previous year, and eight Europeans were temporarily engaged on the necessary inspection work in connection with both European and native cotton, their salaries being paid by the Empire Cotton Growing Corporation. Greater benefit would probably accrue were it compulsory to clean and cultivate the land as well as uproot and destroy the bushes.

Cotton is a crop which fluctuates in yield from year to year even in countries with more suitable and less varying growing seasons than Nyasaland. Here it will always be very speculative whilst dependant on rainfall for soil moisture owing to the wide and annual variation in commencement of rains, in distribution over the growing season, and in the total amount, with the corresponding wide variations in temperatures and sunshine. It follows from this that selection of an ideal strain is most difficult, as plants which appear perfect in any given year will in all probability give most disappointing results in the succeeding years when the climatic conditions are very dissimilar. Nothing approaching stability can be expected in cotton production in Nyasaland until such time as large areas below the 2,000 feet contour can be brought under irrigation, the crop being sown in the autumn or winter, and harvested just prior to the rains. The mere provision of irrigation facilities does not however solve the matter, but only brings in a new lot of problems to be solved, as all countries using irrigation know to their cost.

Tobacco.—After several disappointing crops, owing to unfavourable climatic conditions tobacco growers were rewarded with one that was relatively excellent, and which enabled many planters whose financial position had become precarious to effect a substantial recovery. The climatic conditions being comparatively favourable, the incidence of disease was much less pronounced. There was also more competitive buying of crops in the Protectorate than in previous years and prices generally maintained a satisfactory level.

Through the courtesy of the Southern Rhodesia Administration the majority of tobacco growers were enabled to meet Mr. H. W. Taylor, the cotton and tobacco specialist who has spent many years in that not greatly dissimilar colony. Mr. Taylor during his brief visit inspected a large number of estates in the principal districts and his advice given at the time, together with a subsequently submitted report, gave much encouragement to those engaged in the industry, and will prove of great benefit if generally put into practice.

The salient defects pointed out by Mr. Taylor were :—

- (a) Dependence upon idiosyncrasies of local buyers, often leading to attempts at producing a class of tobacco for which an estate is unsuitable. This results in a poor product, and a low price to the grower.
- (b) Incorrect topping of plants, both bright, and dark types being treated alike.
- (c) Reliance to a large extent upon imported seed, which results in lower yield and indifferent quality as compared with acclimatised seed.
- (d) Inadequate accommodation for curing the crop, together with in many cases, lack of systematic lay-out of buildings in relation to fields.

The use of artificial fertilisers is receiving more attention and this, with the advantages accruing from the investigations of the Agricultural Chemist into soil types and management, makes the production of good tobacco much easier. Erratic climatic conditions will always tend to lower the value of any crop, but if the experience gained during the past three years was associated with a determination to rely on home raised seed, the losses in even the most unfavourable growing seasons would be insignificant in comparison with the past.

Tea.—This crop continued to prosper, thanks to the high prices ruling on the home market. The export increased to just over 1,000,000 lbs. whilst the local valuation of the export increased by nearly £20,000. The prosperity has been wisely utilised by many estates to improve the future of the industry and to forestall a later fall in prices. Extensions of cultivated areas, better provision for drainage, more extensive and up-to-date factory plant, and importation of seed of improved jats are some of the ways in which the progressive estates have acted wisely.

Whilst the areas of suitable land with favourable climatic conditions for this crop are not extensive, it is estimated that in the Mlanje district there are at least 45,000 acres capable of producing good tea, given the necessary capital and labour supply.

NATIVE AGRICULTURE.

Cotton.—The year's production is the best yet achieved, and is due to a combination of favourable factors, including excellent instruction by the Agriculturist in charge of the Lower River districts, generous assistance by the staff of the British Cotton Growing Association, a favourable season from a climatic point of view, and relative immunity from insect pests. The annual production during the past five years is as follows :—

Year.	Seed cotton (tons).
1920	315
1921	375
1922	387
1923	747
1924	1,369

The above figures include the production by two natives on leased land (46 tons) but does not include that purchased from natives who grow cotton on certain freehold lands in the Southern Province for sale to the landowners. The amount purchased by the British Cotton Growing Association under the agreement with Government amounted to 1,199 tons, whilst the Association purchased 14 tons in districts to which the agreement did not apply, as well as the crops of the natives referred to above as being produced on leased lands. Other buyers acquired some 109 tons in districts to which the agreement does not apply, principally North Nyasa.

The total sum disbursed in purchase of the crop is approximately £24,500, as compared with £13,500 in the previous year, whilst the amount set in circulation for buyers commission, transport, etc., is considerable.

The production by districts is approximately as follows in comparison with the previous year :—

	1923.	1924.		1923.	1924.
Lower Shire	477	732	Liwonde	—	11
Chikwawa	75	128	South Nyasa	14	101
Central Shire	53	99	Dedza	—	12
Mlanje	61	83	Dowa	—	6
Ncheu	37	100	Karonga	32	97

The further development of the industry can be confidently expected in all districts in which cotton is produced below the 2,000 foot contour line, although adverse climatic conditions will periodically cause a set-back. In effect this means relatively little extension in the Mlanje and Ncheu districts where there is a rival crop in tobacco, whilst the suitable cotton producing area in the former district is not large. Of the total 1924 product it will be noted that no less than 860 tons was produced in what may, geographically, be termed the Lower Shire area, where all the producing land is below the 1,000 foot contour. From Liwonde to Karonga (with the exception of the West Nyasa district) there are excellent prospects for increased production. The Agriculturist (based on Fort Johnston) for the Lake areas has not been stationed there long enough to have materially affected 1924 results, but considerable interest is being taken in the crop as a result of his instruction, judging by the greatly increased demand for seed.

In addition to Native Instructors, the industry really requires the assistance of two more Agriculturists, one for the North Nyasa district, and another for the Central Shire, Liwonde and Ncheu districts if the utmost development is to be expected. Apart from additional growers, improvement would come from a definite rotation of crops, whilst in many districts it would be possible to encourage the use of oxen and light ploughs in order to improve cultivation.

Tobacco.—The interest in this crop as a native industry is maintained both by natives and Europeans, the latter however being divided into two classes, one hoping to prosper in the buying of the crop, whilst the other fears that attention to the crop by natives will be detrimental to the European tobacco industry by reducing the available labour, and by throwing on the home markets a quantity of inferior leaf which will tend to lower the reputation of and demand for Nyasaland tobacco. Discussions took place during the year in connection with the regulation of the industry but no action was taken upon the recommendations submitted. Early control is desirable from many points of view, the dangers to be guarded against including:—

Production of inferior tobacco.

Excessive production.

Destruction of soil fertility and fuel supplies.

Neglect of food crops.

The most essential regulation, which will minimise all the above dangers is a strict limitation of individual hut holders to a small area of tobacco in each year. With such limitation effected there is no reason why a substantial production of good leaf should not be turned out, without unduly interfering with labour supply for European estates. The desired end is that a native shall only grow as much as he and his family can handle without recourse to employment of other natives or neglect of his food crops, so long as he resides on Crown land under the present system. The more ambitious or experienced native should lease land under the generally prevailing conditions of rent, tenure, etc.

The production for the year can only be estimated owing to absence of any regulations for the submission of statistics by buyers. It is believed that the exported leaf would be about 500 tons, a large amount being discarded after purchase owing to various defects.

Food Crops.—Excellent crops were secured in practically all districts owing to a favourable growing season.

GOVERNMENT LIVE STOCK.

The reduction of Government herds during the year resulted in the sale of 308 head, the proceeds amounting to £1,238. Two herds remain on hand, one at Chiromo the other at Port Herald. In each case the pure-bred imported Zebu animals are being developed as well as a grading up of the native stock by the Zebu bulls. The health of the animals has been satisfactory, and it is hoped to be able to dispose of the remaining native animals in 1925, retaining the Zebu pure-breds and the grade animals. The two herds consisted of 110 head at the end of the year, but the aim will be to keep the total below 60 by frequent disposal of grade oxen and less desirable cows.

PLANT INTRODUCTION, SEED SELECTION, ETC.

The closure of the Namiwawa farm has for the time left the Department without a station for this important work. The proposal to set up a small station near Zomba was not carried out, partly owing to abnormal duties of the Assistant Director, partly owing to absence of suitable Crown Land within a short distance of the office.

Permits for importation of cotton seed during the year were refused, and regulations were introduced with a view to checking the indiscriminate importation of tobacco seed. When, as is desirable, considerable attention is given to raising seed locally the regulations should be made more stringent as there is no doubt that acclimatised seed is more satisfactory, quite apart from danger of imported seed bringing in new diseases.

Importations of tea seed were permitted under suitable precautions. Whilst it would possibly be more sound from a scientific point of view to select special plants from those in the country and raise seed from these, the process would be excessively slow and it was deemed expedient to permit the importation of large quantities from jats which have given satisfaction in India. It does not follow that this seed will give better results in Nyasaland than local seed, but, it is believed by the importers that it will.

EMPIRE COTTON GROWING CORPORATION.

The valuable assistance of the Corporation to the Government has continued as in the previous year, the same staff being on duty, whilst the salaries of the temporary Inspectors appointed to ensure the destruction of old cotton plants were generously paid by the Corporation. The first year's work on the new experimental station of the Corporation was of decided interest, and promises to lead to results of economic importance. It is however yet too soon to say whether heavier yielding cotton will be evolved by isolation of local plants and their increase, or by the acclimatisation of imported varieties. It must be also realised that a strain which is promising on the station, with virgin soil, will require further trials on the relatively impoverished soils of most estates before any authoritative pronouncement is possible, and Mr. Sampson and his staff will therefore be confronted with many difficult problems for some years to come.

AGRICULTURAL SHOW.

An event of importance was the revival of the Agricultural Show which had been in abeyance for 10 years owing to the dislocation of the industry during and subsequent to the war. Keen interest was shown by the visitors, but the diffidence of planters resulted in relatively moderate entries in many classes, no doubt due to the numerous changes of estate owners and managers since the previous show. The staple crops, tobacco and cotton, attracted several excellent exhibits but keener competition is desirable. The general tendency to follow the bad practice of growing one crop only was revealed by the meagre entries in the other classes.

Extraordinarily keen competition was evinced in the native section of the Show where many excellent exhibits of produce were staged. It will be desirable to encourage shows for natives in the various administrative districts, leaving the winners to compete again at the Blantyre Show, thus reducing congestion somewhat, and enhancing the quality of exhibits.

DIVISIONS.

The work of the Veterinary, Forestry, Chemical and Biological Divisions is reported on in annexures by the respective officers. The health of live stock was on the whole satisfactory, the major losses being caused by trypanosomiasis in the Chiromo area. The Forestry Division was fully occupied in developing the series of Forest reserves which are so essential, whilst the Agricultural Chemist, combining the duties of Assistant Director for most of the year, was fully employed in meeting the numerous demands of the European planters for his assistance.

Staff.—The following officers were absent on leave during the year:—

- E. J. Wortley, M.B.E., Director of Agriculture, June 24th to December 31st.
- E. W. Davy, Assistant Director, January 1st to April 21st.
- F. Barker, Agriculturist, January 1st to March 23rd.
- J. Callow, Clerk, January 31st to November 17th.
- C. Smee, M.C., Entomologist, April 30th to December 15th.
- J. E. A. Carver, Forest Officer, February 26th to November 5th.
- C. G. Searle, Forester, October 12th to December 31st.
- J. M. Culhane, Veterinary Officer, January 1st to May 8th.
- J. A. Griffiths, Chief Veterinary Officer, November 1st to December 31st.

On the departure of the Director of Agriculture on leave Mr. E. W. Davy assumed his duties and Mr. A. W. J. Hornby assumed those of the Assistant Director, whilst Mr. J. de Meza assumed the duties of the Chief Veterinary Officer on the departure of Mr. J. A. Griffiths.

The officers of the Department have taken the keenest interest in their work throughout the year and have accomplished much useful work. The two Agriculturists employed on native agriculture in particular have accomplished much arduous travelling in their respective centres.

E. W. DAVY,
Acting Director of Agriculture.

EUROPEAN AGRICULTURE, 1924.

Name of District.	Total Acreage under cultivation.	COTTON. (Lint)		TOBACCO.		MAIZE.		TEA.		COFFEE.		C'EARA.		RUBBER. PARA.		CHILLIES.	
		Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.	Acres under crop.	Yield lbs.	Acres under crop.	Yield lbs.	Acres under crop.	Yield cwts.
Lower Shire	6,934½	2,238	1,591½	54	22	45	350	..	..	..	..	..	..	..	..	..	..
Chikwawa	8,060	7,383	6,820	..	..	482	4,783	..	..	..	..	..	..	..	..	10	18
Central Shire	1,114½	..	..	837	2,970	193	1,420	..	..	..	..	..	..	..	..	..	..
Cholo	12,471	2,041	939	5,813½	18,477	709	6,613½	509	978	18	..	80	..	..	..	2	3
Mlanje	9,835½	2,744	1,154½	1,811	5,586	265	2,135	4,583	9,014	264	..	..	..	..	..	57	60
Blantyre	5,165	110	37	3,653	11,815½	374	4,000	..	..	180	220½	215	..	..	..	23	5
Chiradzulu	4,090	1,865	597½	1,692	6,467½	163	1,910	..	..	43½	..	..	..	..	..	..	..
Zomba	9,674	4,791	1,755	3,790	10,331	673	7,375	..	..	..	..	..	..	..	..	..	..
Upper Shire	1,272	1,160	533	96	260	4	40	..	..	..	..	..	..	..	..	..	..
South Nyasa	1,453½	50	31	1,291	4,320	29	30	..	..	1	..	..	..	..	..	..	..
Ncheu	2,038	845	124½	923	2,970½	100½	1,520	..	..	154	124½	..	..	..	..	..	..
Dedza	1,194	650	497	368	894½	65	940	..	..	..	..	..	..	..	..	2	..
Fort Manning	73½	..	..	..	..	6	40	..	..	..	..	..	..	..	..	..	..
Lilongwe	364½	6	4½	302	1,100	3	60	..	..	..	..	..	..	..	..	..	..
Dowa	303	283	187	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kota Kota	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kasungu	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mombera	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
West Nyasa	1,549	..	..	9	69	..	..	..	..	..	..	..	..	..	..	..	..
North Nyasa	2,676½	1,954	1,150	..	..	295	5,460	14	..	1½	..	..	..	1,500	125,070	10	20
Total	68,268½	26,120	15,421½	20,590½	65,283½	3,406½	36,676½	5,093½	9,992½	424	345½	295	..	1,500	125,070	102½	102

EUROPEAN AGRICULTURE, 1924.—Continued

Name of District.	CAPSICUMS.		FIBRES.		BEANS.		GROUNDNUTS.		WHEAT.		FODDER AND FORAGE CROPS.		TIMBER AND FIREWOOD.		ENGLISH POTATOES.		MILLETS.	
	Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.	Mucalypus.	Others.	Acres under crop.	Yield cwts.	Acres under crop.	Yield cwts.
Lower Shire	4,616	23,300	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Chikwawa	3	2½	...	...	2	...	...	...	...	...	...	...	180	960
Central Shire	1	5	...	...	...	...	...	...	47	36½	...	...	...	...
Cholo	1,256	3,580	453	854½	7	62	1	1½	...	...	1,412	169½	...	...	...	...
Mlanje ...	3	5½	...	...	30	70½	...	...	...	5	...	...	126½	189½	...	...	...	...
Blantyre ...	40	120	...	...	14	37½	...	...	...	...	...	...	512	44	...	...	...	...
Chiradzulu	119	166	2	5	...	...	...	...	246	3	...	...	...	...
Zomba	119	371½	7½	40½	4	5	...	...	131	115	...	...	...	...
Upper Shire	1	10	4	10	...	...	...	...	...	7	...	...	...	...
South Nyasa	9	6	...	...	1½	1½	...	...	48½	23½	...	...	...	...
Ncheu	2	10	...	...	4	1	...	...	4	5½	...	...	...	...
Dedza ...	½	2	...	...	11	22	12	110	21	143½	...	...	38	13½	15	325	...	...
Fort Manning	15	56	6	21	15	57	...	...	6	25½	...	...	...	...
Lilongwe	½	...	...	...	...	...	...	...	...	...	...	53	...	...	...	...
Dowa	7	26	...	...	7	6	...	...	...	...
Kota Kota
Kasungu
Mombera
West Nyasa	30	...	...	...	...
North Nyasa	206	1,750	1	6	135	1,200	...	...	8	81	...	...	...	...
Total	48½	127½	5,902½	26,880	977	3,361½	39½	254½	191	1,439½	...	...	2,586	802½	15	325	180	860

NATIVE AGRICULTURE, 1924.

District.	Seed. Cotton.	Rice.	Wheat.	Ground- nuts.	Tobacco.	Maize.	Peas and Beans.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Lower Shire	732	—	—	—	—	—	—
Chikwawa	128	—	—	—	—	—	—
Central Shire	99	—	—	—	—	—	—
Cholo	—	—	—	—	—	—	—
Mlanje	83	5	—	—	500 Estimated.	—	—
Blantyre	—	—	—	—		—	—
Chiradzulu	—	—	—	—		—	—
Zomba	—	—	—	—		—	—
Upper Shire	11	—	—	—	—	—	—
South Nyasa	101	20	—	—	—	—	—
Nchen	100	—	—	—	—	—	—
Dedza	12	—	—	—	—	—	—
Fort Manning	—	—	—	—	—	—	—
Lilongwe	—	—	—	—	25	—	—
Dowa	6	130	13	—	—	—	—
Kota Kota	—	94	—	—	—	—	—
Kasungu	—	—	—	—	—	—	—
Mombera	—	—	—	—	—	—	—
West Nyasa	—	16	—	—	—	—	—
North Nyasa	97	—	—	—	—	—	—
Total	1,369	265	13	—	525	—	—

NOTE.—Maize is the staple foodstuff in most districts, but no estimate can be given of quantities grown. Groundnuts and beans are grown in various parts.

LIVE STOCK OWNED BY EUROPEANS AT 31ST DECEMBER, 1924.

District.	Cows and Heifers over 1 year.	Bulls.	(.) Xen.	(.) Alve.	Pedigree Cattle.	Horses.	Mules.	Donkeys.	Sheep, European.	Sheep, half-bred.	Sheep, native.	Goats.	Pigs.
Lower Shire	1,350	28	728	432	...			3	...	...	387	216	58
Chikwawa ...	508	16	440	363				31	...	...	160	32	55
Central Shire ...	48	2	66	33	...	...	1	2		...	7	15	1
Cholo ..	1,009	48	1,144	452		...	4	20	...	114	472	219	285
Mlanje	954	23	796	388				4	...	87	253	231	85
Blantyre	2,207	41	1,801	1,205		1	2	88	...	...	184	101	385
Chiradzulu ...	416	13	349	213				19	...	50	46	1	117
Zomba ...	735	20	749	427	3	1	2	57	...	...	251	47	108
Upper Shire ...									...	...	20	37	
South Nyasa ...	241	10	158	132				8			66	160	
Ncheu ...	422	12	337	114			1	5	20	20	123	209	263
Dedza ..	312	16	263	134		...	3	70	...	...	89	9	348
Fort Manning	153	3	95	42				4	...	...	34	11	21
Lilongwe	166	2	96	29	...			7			...		38
Dowa	151	3	74	36	...	2		22	...	...	24	3	33
Kota Kota	33	...	2	6	...			...	...	...	...	...	...
Kasungu			...		...			...	...	...	...	...	...
Mombera	12	1	8	7				6			6	...	2
West Nyasa	10	1	...	4					...	...	...	...
North Nyasa	119	5	122	44				2	...	...	92		62
Total	8,846	244	7,228	4,061	3	4	13	343	...	271	2,164	1,291	1,861

NATIVE LIVE STOCK, AS AT 31ST DECEMBER, 1924.

District.	Cattle.	Sheep.	Goats.	Pigs.
Lower Shire	8	1,200	6,500	7,000
Chikwawa	62	881	2,732	2,817
Central Shire	412	368	2,519	655
Cholo	160	616	2,494	1,574
Mlanje	23	495	3,300	1,650
Blantyre	500	1,239	4,476	2,175
Chiradzulu	1,144	1,669	6,952	3,302
Zomba	417	1,100	7,200	—
Upper Shire	8	3,100	5,120	10
South Nyasa	698	12,426	11,372	—
Ncheu	4,500	4,500	12,500	2,500
Dedza	5,255	4,829	24,495	3,925
Fort Manning	1,022	3,405	3,812	1,025
Lilongwe	10,500	14,000	38,000	4,000
Dowa	16,243	25,289	27,510	3,948
Kota Kota	1,400	1,500	2,000	300
Kasungu	3,500	300	3,000	—
Mombera	27,000	7,200	1,000	180
West Nyasa	3,044	446	1,066	—
North Nyasa	25,597	548	1,053	—
Total	101,493	85,111	167,101	35,061

CROPS.			LIVE STOCK.	
Nature of crop.	Number of acres under cultivation.	Gross quantity of produce (for local consumption and export).	Nature of live stock.	Number.
<i>European Agriculture.</i>		Cwts.	<i>European and Native Live stock.</i>	
Tobacco	20,590	65,283	Horses	4
Cotton (Lint)	26,120	15,421	Asses	343
Tea	5,093	9,992	Mules	13
Fibres	5,902	26,880	Horned cattle	121,875
Chillies	102	108	Sheep	87,546
Capsicums	43	127	Goats	168,392
Coffee	424	345	Pigs	36,922
Maize	3,406	36,676		
Millet	180	860		
Wheat	191	1,439		
Beans	977	3,361		
Groundnuts	39	254		
Potatoes	15	325		
Rubber	1,795	125,070 lbs.		
<i>* Native Agriculture.</i>		Tons.		
Cotton (Seed cotton)		1,369		
† Tobacco		525		

* It is not possible to give an estimate of native acreage or yields.

VETERINARY.

During the year under review there have been no reductions in, or additions to, the Veterinary staff.

There have been no serious outbreaks of epizootic diseases, but trypanosomiasis has caused heavy losses, and the occurrence of this disease is causing considerable anxiety.

There have been no outbreaks of east coast fever in the Southern Province, but certain aspects of this disease need careful study, which it is hoped will be given during the forthcoming year.

Dipping is becoming even more popular among both the European and native cattle owners, and in some areas ticks have been practically eradicated, with a corresponding fall in the number of cases of diseases borne by these pests.

The trade in live stock continues to steadily advance and meat is becoming more and more a daily diet amongst the natives of the Southern Province. More natives are keeping cattle each year, but these owners have not yet realized the value of cattle apart from their being a source of revenue from the sale of milk. There seems, however, to be a certain amount of prejudice against such milk on the part of Europeans and several native owners complain that they are unable to sell. This department is instructing these natives in the more simple rules of breeding and management of cattle and advising as to other sources of revenue to be obtained from their cattle. The cattle brought from the Central Province sold readily in Zomba and Blantyre. Prices have gradually found a mean and the native vendors have gained confidence. Again a most marked shortage of cows and heifers for sale was noticeable and the trade would advance considerably if the natives of the Central Province could be persuaded to export female stock. The number of native owners in the Shire Highlands would also considerably increase if cows could be purchased at reasonable prices.

MEAT INSPECTION.

All meat offered for sale in the Townships of Zomba, Blantyre and Limbi is now inspected. These duties have been carried out by the Veterinary department in Zomba during the whole year, in Blantyre and Limbi since October. In Limbi the inspection is carried out by a native who was educated in the Blantyre Mission Hospital and who has received a special course of instruction from this department.

The number of carcasses inspected is as follows :—

	Cattle.	Goats and Sheep.
Zomba	266	2,056
Blantyre (four months only)	276	782
	<u>542</u>	<u>2,838</u>

CONTAGIOUS DISEASES.

Rinderpest.—The cattle register, the preparation of which has been carried on in the Nyasa district as a precautionary measure for control of this disease, is now completed. The Stock Inspector in charge of this work will continue to keep the register up-to-date.

The disease still continues to cause heavy mortality amongst cattle in Tanganyika Territory, but the position remains satisfactory as far as it spreading southwards is concerned.

Trypanosomiasis.—This disease has caused grave concern during the period under review. Large numbers of animals have died in the Lower Shire and Chikwawa districts and except in one instance, careful searching has failed to discover the actual area where the tsetse is. This factor alone has made the situation most difficult to overcome. Again it is necessary to lay stress on the urgent necessity of careful widespread research, not only in Nyasaland, but in all the tropical African territories. Moreover it would seem most desirable that such research should be conducted and organised from a central chief, with a central headquarters, where all records and reports should be filed for reference and comparison.

Apart from the widespread outbreaks in the Lower Shire and Chikwawa districts, which have been more severe than ever previously, there has been no abatement in the other areas, deaths being recorded from North Nyasa, Mzimba, Kota-Kota, South Nyasa, Zomba and Blantyre districts.

Treatment with potassium antimony tartrate has been continued, but with not very satisfactory results.

Two dogs suffering from trypanosomiasis have been treated with Bayer 205, but both succumbed. In the opinion of one officer in this department, this drug has a very injurious effect on the stomach and liver of the animals, causing severe haemorrhages and necrosis.

Tuberculosis.—No cases have been recorded during the year.

TICK BORNE DISEASES.

East Coast Fever.—The epizootic which occurred in the Southern Province during 1921 appears now to have been completely suppressed. Research workers in other parts of Africa are putting forward the theory that, contrary to what is at present believed, animals that recover from east coast fever are *not* immune nor “clean” and serve as foci for further outbreaks. This supposition must engage our attention as, should it prove correct, we must alter our methods of stamping out the disease.

Red Water Fever.—Several cases of red water fever were recorded mostly in work oxen subjected to heavy work and exposure. Most of these cases recovered. The country is feeling the benefit of systematic dipping; more and more cattle are being dipped each year. In the case of native owned cattle brought to the Southern Province from Angoniland, four dippings are carried out. This method has proved successful in keeping down such diseases as east coast fever. It is desirable however that other quarantine stations with dipping tanks should be erected, at least one each at Dedza and Ncheu.

SKIN DISEASES.

The position as regards these diseases is most satisfactory. Demodectic mange has been practically stamped out in the Southern Province. Here again dipping has been largely responsible.

Seasonal Gastro-enteritis of cattle or Grass sickness.—This disease has not been nearly so severe as during last year. Very few cases have been recorded although the season has been quite as severe as formerly and experiments point to some factor in the disease which is at present obscure.

OTHER DISEASES.

Anthrax.—Only one case has been diagnosed.

Black quarter.—No outbreaks occurred.

Distomiasis.—This disease seems to have been less severe during the period under review, especially among cattle.

Taenia Hepation.—There is no falling off in the number of cases recorded.

Coccidiosis.—No cases have been recorded in cattle, but a typical case was met with in a native rabbit.

Foot and mouth disease.—No cases recorded.

Glanders.—No cases recorded.

African horse sickness.—No cases recorded.

Ulcerative lymphangitis.—No cases recorded.

Sheep pox.—No cases recorded.

Goat pox.—No cases recorded.

Swine fever.—No fresh outbreak occurred.

Diseases of Dogs.—Canine piroplasmiasis has been of more frequent occurrence. Many cases have proved most obstinate and in several cases a broncho-pneumonia and abscess formation in the throat has been recorded. Canine typhus has been frequently diagnosed, whilst distemper is now met with quite often. Trypanosomiasis has caused several deaths. Rabies, usually of the so called dumb variety, has been recorded in numbers exceeding those of former years and this disease will need careful watching in the future.

Diseases of Poultry.—Contagious epithelioma, fowl cholera, diarrhoea of fowls have all occurred frequently.

LIVE STOCK.

The official returns for live stock for the year ending December 31st, 1924, are as follows:—

	Mules.	Horses.	Donkeys.	Cattle.	Sheep.	Goats.	Pigs.
European owned	13	4	343	20,382	2,435	1,291	1,861
Native owned	—	—	—	101,493	85,111	167,101	35,061
Totals	<u>13</u>	<u>4</u>	<u>343</u>	<u>121,875</u>	<u>87,546</u>	<u>168,392</u>	<u>36,922</u>

During the year the whole of the Government herds, with the exception of the Indian-Zebu breeding herds were sold by auction.

It is to be hoped that the distribution of the pure bred bulls will result in a general improvement of stock generally. At present few records have been received as to the breeding results since the Government herds were dispersed. No fresh animals have been imported during the year.

The native cattle trade from the Central Province to the Shire Highlands has gone forward considerably and is now most promising. More and more natives around principal towns and plantations are eating meat and keep cattle. The native owned cattle in the Central Province would benefit greatly if better bred bulls were introduced. Great benefit will also accrue when it is found possible to erect dipping tanks throughout the area.

WORKING OF VETERINARY DIVISION.

The Chief Veterinary Officer was on duty from 1st January until October 30th when he proceeded on leave of absence. The Veterinary Bacteriologist carried out the duties of Veterinary Officer, Southern Province, from the beginning of the year until the departure of the Chief Veterinary Officer, when he returned to Zomba to take charge of the Division. Capt J. M. Culhane returned from leave in May. He made an extensive tour of the Northern Province and then took charge of the Southern Province. Mr. S. Anderson, was on duty throughout the year, being in charge of the Central Province. Mr. E. C. Holt, Stock Inspector, was on duty throughout the year being stationed in the North Nyasa district with headquarters at Karonga. During this period he completed the cattle Register for the North Nyasa district and supervised the branding of 7,089 head of cattle.

During the year 716 separate Laboratory examinations were made in Zomba and Blantyre.

Field experiments were carried out investigating the treatment of seasonal gastro-enteritis and trypanosomiasis. The laboratory work for certain diseases of tobacco was also undertaken by the Veterinary division.

During the year 508 samples of dip were tested.

The number of letters dealt with by the Zomba and Blantyre Offices were 3,565, exclusive of permits issued, accounts rendered or reports of dip tests.

There were ten dipping tanks under the direction of the veterinary service during the year. The number of animals dipped in these tanks is as follows:—

Cattle.	Goats and Sheep.	Dogs.	Totals.
64,243	11,230	10	65,483

The number of privately owned dipping tanks is 58 and these are periodically inspected and regularly tested by the Veterinary Division.

The number of animals passing through the Government quarantine stations at Blantyre and Zomba is as follows:—

					Cattle	Sheep and Goats.
Blantyre	...	...	...	...	1,659	3,420
Zomba	...	...	...	...	546	312
					<u>2,205</u>	<u>3,732</u>

J. DE MEZA,
Acting Chief Veterinary Officer.

FORESTRY DIVISION.

1.—FOREST AREAS.

(a) *Demarcated Forest Reserves.*—The proclaimed demarcated forest reserves existing at the end of the year were as follows:—

Name.	District.	Approx Area.	Date of Proclamation.
1. Zomba Mountain ...	Zomba ...	10 sq. miles	1913
2. Dzalanyama ...	Lilongwe ...	470 "	1922
3. Kanjedza ...	Blantyre ...	512 acres	"
4. Ndirande ...	" ...	7 sq. miles	"
5. Soche ...	" ...	1½ "	revised 1924
6. Fort Alston ...	Kasungu ...	1140 "	1922
7. Matandwe ...	Lower Shire ...	125 "	1921
8. Cholo Mountain ...	Cholo ...	24 "	"
9. Liwonde ...	Upper Shire ...	100 "	"
10. Mangoche ...	South Nyasa ...	125 "	"
11. Namizimu ...	" ...	250 "	"
12. Pirolongwe ...	" ...	50 "	"
13. White Rock ...	" ...	230 acres	"
14. Mvai ...	Ncheu ...	30 sq. miles	"
15. Dzonje ...	" ...	18 "	"
16. Chongoni ...	Dedza ...	130 "	"
17. Escarpment ...	" ...	35 "	"
18. Mchinji ...	Fort Manning ...	50 "	"
19. Nchisi ...	Kota-Kota ...	30 "	"
20. Chiradzulu Mountain ...	Chiradzulu ...	12 "	"
21. Malosa ...	Zomba and Liwonde ...	25 "	"

Total 2634 Sq. miles approx.

Many of these areas are important watersheds and have been reserved mainly with the object of maintaining and improving water-supplies. Some of them contain forest of a slightly better quality than the poor type general to the Protectorate.

(b) *Undemarcated Forest.*—Further information regarding undemarcated forests was collected during the year. This indicates that they very largely consist of a type composed of small trees which, even when mature, are mostly of small dimensions and of little commercial value except as poles and fuel. The forest tracts are generally extensively interspersed with native settlement.

The riparian forests (invariably a mere fringe along the banks of rivers and streams) are, in some districts, of very good quality.

2.—EXAMINATION OF NEW TRACTS.

A. Examined and reported on by the Forest Officer, Southern Division.

(1) *Malosa Mountain.*—Zomba and Liwonde Districts. (Approx. area 25 sq. miles.) A range of hills running in a northerly direction from the Domasi River, and west of the Zomba-Fort-Johnston road.

It is an important watershed, but on the whole the area is only poorly covered with forest having contained extensive native settlement in the days of tribal warfare. The western portion of the Reserve is well stocked with "Msuku"; otherwise there is little timber except along stream banks and in the gullies near the top of the hills.

The soil is generally poor consequent on erosion in the past due to cultivation on the slopes.

This Area is now proclaimed a Forest Reserve.

(2) *Mlanje Mountains.*—Mlanje District (Approx. area 150 sq. miles). An important watershed and contains, in the higher gullies and ravines, patches of forest containing *Widdringtonia Whytei* (Mlanje cypress)—the main source of Government timber supply. These patches of forest have, for some years past, been protected and portions put under management.

The outer slopes have now been examined with the object of defining a boundary for reservation of the area. Of these the western and northern are to a certain extent denuded owing to native settlement. The other slopes are fairly well covered with forest there being large tracts consisting of useful timbers such as Msuku, Muula and Mlombwa.

Along the stream banks there is a good proportion of valuable trees, e.g., Mbawa, Mwenya and Kweranyani.

(3) *Tuchila.*—Mlanje District. (Approx. area 20 sq. miles). A range of hills running in a northerly direction from the junction of the Ruo and Tuchila rivers. The western slopes have a good covering of forest, but natives (mostly newly arrived from Portuguese territory) have entered and are destroying the forest in the making of gardens. Reservation is considered to be essential.

(4) *Chigamula*.—Blantyre District. (Approx. area 1,000 acres.) An area lying between the Limbe stream, Chigamula hill, and the Limbe-Cholo road. For some years its forest growth has been protected against native destruction and contains a good proportion of useful timber species such as Msuku, Msopa and Mlombwa with Mbawa and Mwenya along the stream-banks. It is one of the few patches of indigenous forest (Crown Land) remaining in proximity to the Limbe and Blantyre townships.

B. Examined and reported on by Forest Officer, Northern Division.

(5) *Kongwe Mountain*.—Dowa District. (Approx. area 7 sq. miles.) A prominent mountain a few miles north of Dowa Boma, near the Nchisi road. It is rather sparsely covered with scrubby trees which are constantly being cut for fuel whilst in an early stage of growth. It is the centre of a densely populated and almost tree-less area and is considered to be important from the point of view of local water supply.

(6) *Nkhoma Mountain*.—Dowa District. (Approx. area 6 sq. miles). It lies near the southern boundary of the district, is covered with small scrub and considered to be of importance in connection with water supplies.

C. (7) *West Nyasa District*. A short preliminary examination, of portions of this district, was made by the Chief Forest Officer with the object of ascertaining the nature of its forest resources and the steps immediately necessary for forest conservation.

3.—DEMARCATIION.

The boundaries of the following Forest Reserves were demarcated:—

(1) *By Forest Officer, Southern Division*. Liwonde, Chiradzulu Mountain, Cholo Mountain, and Matandwe.

(2) *By Forest Officer, Northern Division*. Mangoche, Namizimu, White Rock, Mvai, Dzonje, Escarpment, Chongoni, Dzalanyama and Mchinji.

Method of demarcation. The usual form of beacon erected consists of a pole surrounded by a heap of stones at its base. These were placed:—

(a) At points marking a change of direction in the boundary.

(b) At points where native paths enter a Reserve.

(c) At points on the boundary opposite to villages or groups of villages in proximity to a Reserve. In some such cases small sections of the boundaries were also marked by a hoed line.

All headmen and villagers living near a Reserve were shown the beacons and the line of the boundary.

4. SURVEYS.

No surveys were undertaken during the year.

5.—WORKING PLANS.

The work of the Department is at present controlled by "Annual plans of operations" and "Preliminary planting plans." Much of the time of the staff is at present taken up in the selection and demarcation of forest reserves, organizing forest protection, control of licences, etc., and it may be some time before it will be possible to undertake much investigation and field work (including surveys and accurate mapping) necessary for the preparation of more elaborate forest working plans.

6—COMMUNICATIONS AND BUILDINGS.

Paths and tracks were hoed and maintained in the Zomba Mountain Reserve and on Mlanje Mountain. Two large sheds were erected at the base of the latter for the storage of sawn timber transported down the Likabula Valley track. Some minor repairs were effected on the quarters of the Forest Officer, Northern Division, at the Bar, Fort Johnston. The road between Malindi and White Rock Reserve was rendered fit for the use of a motor cycle. Tracks to the Kanjedza Reserve and neighbouring nurseries were improved to allow of their use by motor cycle.

7.—PROTECTION OF FORESTS.

(a) *General*.—The staff of forest-guards was increased from 20 to 58 and guards are now employed in all districts of the Protectorate, chiefly in the protection of Forest Reserves and river-bank trees.

Destruction of forest, due to shifting cultivation, is still extensive and in some districts there appeared to be a grave increase in the amount of destruction, due to a large influx and settlement of natives from Portuguese territory which took place during the year.

Control (under the powers of the District Administration (Native) Ordinance), both of settlement and the making of new gardens by natives, is considered to be essential to prevent this indiscriminate destruction of forest.

The Forest Officer, Northern Division, reports the extensive felling by natives of unreserved trees, throughout some districts, to facilitate the collection of processional caterpillars which are eaten by the people.

The introduction of a Bill, to prevent the reckless or careless use of grass fires, was under consideration at the end of the year.

For the better protection of forests the introduction of a new Forests Ordinance to replace No. 5 of 1911, is also under consideration.

(b) *Prosecutions*.—Annual returns of prosecutions under the Forests Ordinance have been received from only a few districts. These returns show an increase in the number of convictions as compared to the previous year.

(c) *Fire Protection*.—The indigenous cypress woods on Mlanje plateau, and all plantations, were protected by means of hoed and burnt fire-belts. Extra guards for patrol were also employed during the two or three months prior to the commencement of the rains.

These measures were successful except in the case of the Mudi plantation, Blantyre, where natives started a fire within the plantation causing a certain amount of damage.

A fire-belt was hoed around the boundary of the Soche Reserve by villagers living near the area.

The Resident, Dedza, successfully prevented the spread of fire over Dedza Mountain, involving the extinguishing of no less than ten fires.

Fires passed through most other Reserves and in many cases there was conclusive proof that they were kindled within the boundaries.

In two or three cases headmen brought in the culprits.

The potential value of most of the forests of the Protectorate (including Reserves) would not justify any large expenditure on the maintenance of fire-belts even if funds were available, therefore it is considered that the indiscriminate firing of grass must be suppressed by means of legislation and propaganda involving the active co-operation of Residents and their chiefs and headmen.

(d) *Animals, Insects, Fungi*.

Damage by these agents was inconsiderable.

The Forest Officer, Northern Division reports:—

"A small amount of damage by sheep, in a young plantation at the Bar. An inconsiderable amount of damage by hippopotami at White Rock Plantation. Conspicuous damage by elephants in parts of the Dzalanyama Reserve. Partial defoliation by grasshoppers of Casuarina trees in a plantation on the Lake Shore."

The Forest Officer, Southern Division, reports that in some localities *Cedrela toona* was attacked by a caterpillar (not identified) boring down the leading shoot of young trees.

In the Zomba Mountain plantations although a few *Widdringtonia Whytei* (Mlanje cypress) were attacked by the fungus disease reported last year, the number was considerably less than in previous years.

Infected trees were felled, their stumps and upper roots dug out, and the immediate area isolated by trenches. In no case, where this action has been taken in the past, has any spread of the infection appeared.

8.—NATURAL REPRODUCTION.

As there is yet no diminution of grass-firing there is little to add to the remarks made under this heading in the last report. Regeneration which survives the annual fires appears to be mostly coppice or stool shoots rather than seedlings.

In the case of the patches of forest, Mlanje Mountain, (fire-protected), a certain amount of natural regeneration of cypress (*Widdringtonia Whytei*) appears where small clearings are made and the ground is free of weed-growth. Observation and experiment indicate that this natural regeneration cannot to any great extent be relied on probably due to the fact that good seed-bearing trees are so widely scattered amongst the other species forming the forest and that seed is washed out of the soil during the heavy rains.

The Forest Officer, Southern Division, includes the following notes in his report:—

"An experiment was made with Mbawa (*Khaya nyasica*). The ground was cleared round trees and when the seedlings were about three inches high a further cleaning made. This second cleaning was probably done too early as a great number of seedlings died and it would appear that they need protection for some time.

It was noticed in the Mlanje district by such streams where there is good forest growth that *Kweranyani* reproduces very freely and the young plants grow very well under shade. The power of germination also, is very good in places, the ground being carpeted with young plants."

The Forest Officer, Northern Division, mentions the regeneration of "Nsamba" (mostly by coppice shoots), in Angoniland where the species persists even under the most adverse conditions, patches of it being noticeable in tracts of otherwise treeless country.

He concludes his general remarks under this heading, as follows:—

"It appears that it is possible with some species, for the coppice shoots to survive the fires and produce inferior scrub, but that the combination of frequent cuttings and annual fires rapidly leads to their extermination."

9.—SOWING AND PLANTING.

(Planting Season 1923/24).

Owing to financial stringency the afforestation vote of £800 which had been sanctioned in the approved Estimates for 1923/24 was reduced to £400 in June, 1923.

This was most unfortunate in so far that the afforestation plans for the year were already well in hand and plants were being raised in nurseries for the planting up of a considerable acreage of new land during the following rainy season.

Plans had to be very considerably altered and a large proportion of the coniferous plants in the nurseries had to be abandoned because they are unsuitable for carrying over to the following year or for distribution to natives.

The new acreage planted up was therefore small as the following operations have of necessity to be undertaken each year:—

1. Upkeep of nurseries for the raising of plants for filling in blank spaces in previous years plantings, and for distribution to natives.
2. Upkeep of arboretum, and experimental work.
3. Cleaning, thinning, and tending of existing plantations.
4. Fire-protective measures for plantations and the Mlanje Mountain cypress forests.
5. Exploitation of plantations for material for sale.
6. Collection of seed.
7. Replanting gaps due to failures in the previous season's planting.
8. Erecting and maintaining beacons on Forest Reserve boundaries.

Zomba.—Nurseries were maintained at Bwaila, Ntonya and on Zomba Plateau. Blank spaces in the Ntonya plantation, largely due to failure of *Eucalyptus* species, were replanted with *Cassia siamea* and *Cedrela toona*. Extensive replanting of blank spaces was undertaken in the Zomba Mountain plantations, *Widdringtonia Whytei* and *Cupressus lusitanica* being used. Small plots of *Cedrela odorata*, *Cedrela serrata* and *Erythrina vespertilio* were planted in the arboretum.

Mlanje.—A new nursery was formed on the plateau and the old one, which had been in use for some years, was abandoned. Blank spaces in existing plantations were replanted with *Cupressus lusitanica*, and 20 acres (approx.) of cleared forest land was prepared and planted up with *Widdringtonia Whytei*.

A nursery was formed at the Likabula depot for the purpose of raising plants for distribution to natives; *Cedrela toona* seed being sown in December, 1923.

Blantyre.—The Namami, Kazungu and Mudi nurseries were maintained, but many thousands of plants had to be abandoned owing to the alteration of the plans. In the Kanjedza Reserve extensive replanting due to failures had to be undertaken in the previous season's planting area. A new block of 25 acres was planted, *Cupressus lusitanica* and *Callitris robusta* being the species chiefly used, with *Cedrela toona* lining the roads and rides. In the Soche Reserve 22 acres were planted with Mlanje cypress by natives having gardens in the Reserve and a large portion of the boundary was planted with a line of *Cedrela toona*. As an experiment the Forest Officer, Southern Division, also sent 4,000 *Cupressus lusitanica* plants to the Cholo Mountain Reserve for planting in native gardens, but owing to the long journey and the delay in planting them out only about 20 per cent. of the plants were established.

South Nyasa District.—Nurseries were maintained at White Rock Reserve and at Namweras. No Departmental planting was undertaken other than a small plot of *Cassia siamea* planted on the Lake Shore. About 35 acres of *Cedrela toona* were planted by natives having gardens in the Namizimu Reserve, the plants being obtained from the Namweras Nursery.

Lower Shire.—A nursery was maintained at Port Herald and natives living in the Matandwe Reserve were induced by the Resident to establish forest plantations of *Cedrela toona*, each section undertaking to make and tend one plantation. All the plants in the nursery were so used up and an additional supply of 2,000 plants had to be sent from the Limbe nurseries.

Chiradzulu.—Two nurseries were maintained and 60,000 plants raised for distribution to natives during the rainy season 1923/24.

Dowa.—This nursery was maintained and the Resident was able to induce several villages to start their own forest plantations, varying in area from $\frac{1}{2}$ to $1\frac{1}{2}$ acres.

Other Districts.—New nurseries were established by the Residents at Dedza, Mzimba, and Kota Kota, the latter including a nursery on the Lake Shore and one in the Nchisi Forest Reserve.

Area of Plantations.—The total area of plantations under the management of the Department is now 1,075 acres (approx.).

10.—SEED AND PLANTS—SEED.

Collection and Purchase.—Seeds of *Widdringtonia Whytei*, *Khaya nyasica* and several other species were collected from indigenous forests, and quantities of seed were collected from plantations comprising 25 different species.

Seed purchases were made from the Forestry Departments of South Africa and India, and also in U.S.A.

A few exchanges of small quantities were effected.

Sales.—Sales of seed to the public during the financial year 1923/24 totalled $74\frac{1}{2}$ lbs. realizing £53.

Free Issues.—Seed supplied to Missions, etc., for raising plants for distribution to natives, samples to the public, etc., amounted to 28 lbs.

PLANTS.

Sales.—73,500 plants were sold to the public during the year 1923/24 realizing £125.

Free Issues.—Gratis issued to Government departments totalled 20,340 plants.

The total number of plants issued gratis to natives during the planting season 1923/24 is as follows:—

Zomba nurseries	...	51,806
Blantyre	„	6,308
Mlanje	„	28,037
Fort Johnston	„	30,000
Chiradzulu	„	6,000
Port Herald	„	60,000 (estimate)
Dowa	„	10,000 („)

11.—EXPLOITATION.

By Departmental Agency.

1. *Government Timber Supply* (Mlanje Mountain).—As there were ample stocks of sawn cypress timber in hand, which had been cut during the previous two years under supervision of the European Forester, no cutting took place during 1924.

The work was restricted to transport of sawn timber down the mountain to the sheds at the Likabula depot, clearing and burning of debris, and reafforestation. The European Forester was therefore employed at headquarters, making only periodical inspections of the work at Mlanje.

The stock of sawn timber on the mountain was reduced from 11,253 cubic feet as at the 1st January to 7,639 cubic feet on the 31st December, 3,614 cubic feet having been transported during the 12 months. This amount (transported) represented 3,019 men-loads, giving an average of 1,197 cubic feet per load. Carriers were paid 5d. per load therefore the cost of transport works out at 5.01d. per cubic foot.

2 *Poles and Firewood*.—A total of 15 acres of Eucalyptus plantations were clear cut (under the coppice system), part of the produce being sold to the public and part issued to Government Departments. Material derived from extensive thinnings undertaken in other plantations was similarly disposed of.

3.—The Public Works and other Departments under their own agency cut quantities of timber, poles, firewood, and bamboos, from other Crown forests, the Forestry Department exercising as much control as possible.

By The General Public.—No concessions were granted, all exploitation being carried out by means of licences. River-bank trees sold were mostly fallen or dead trees.

Minor Produce and Grazing.—Beeswax and strophanthus-seed were collected from the forests for export. (See para. 15(b.)) The weaving of mats from palm leaves for local trade is carried on to a small extent by natives in localities where palms are plentiful. The fibrous bark of certain trees is used generally as a string for binding purposes and in some of the northern districts of the Protectorate natives still utilize bark-fibre for the manufacture of a crude cloth.

No indigenous rubber (Landolphia) was collected during the year.

Grazing on Crown land was carried on chiefly under licence involving a fee per head of animals, but in the northern districts a few grazing leases were granted.

STATEMENT SHOWING OUT-TURN OF PRODUCE, YEAR APRIL 1ST, 1923, TO MARCH 31ST, 1924.

1.—*Forest Produce Sold.*

	Quantity.	Revenue.
		£
Indigenous timber and poles	22,800 cubic feet	721
„ firewood	21,548 cubic yards	1,347
„ bamboos	56,000	70
Plantation poles	5,400	225
„ firewood	3,364 cubic yards	420

2.—*Forest Produce exempted from Royalty.*

(a).—*Government Departments*.—Output of sawn cypress timber for Public Works Department during the financial year April 1st, 1923, to March 31st, 1924:—

	Value.
19,101 cubic feet net value at 2s. 6d. a cubic foot	£2,388
Mbawa timber	160
Other species timber	84
Poles (mostly Plantation)	184
Bamboos (small)	38
-do- (large)	2
Firewood (including plantation) 14,000	1,006
	£3,862

(b).—*Free Grant to Natives*.—The native population was allowed to take forest produce free of charge and without restriction save as provided by the Forests Ordinance 1911, viz:—

- (a) Within Forest Reserves.
- (b) Reserved trees.
- (c) Within 30 yards of streams.

The produce taken mostly consists of poles, bamboos, and firewood, but as huts have usually to be renewed every 3 or 4 years (or after a shorter period) the estimated amount of produce used annually reaches an enormous figure. In addition there is general destruction due to shifting cultivation which was probably enhanced very considerably in the past year due to the influx of immigrants.

12.—FINANCIAL RESULTS.

A statement of revenue and expenditure appears in Appendix 1. It will be seen that there was a considerable increase in revenue over that of the previous year. The amount of £645 realized from plantation produce compares very favourably with the amounts of the three previous years, viz., £370, £259 and £184 respectively. It will also be noted that there was a considerable increase in the revenue derived from the sale of plants and seed. An analysis of revenue showing amounts collected in districts in respect of the different classes of produce is to be found in Appendix 2.

(a) *Organization*.—There was no alteration in the organization adopted in 1923 and the two forest divisions remain as described in the last Report.

(b) *European Staff*.—The establishment consists of:—

Chief Forest Officer.

3 Forest Officers.

1 Forester.

Mr. J. E. A. CARVER proceeded on leave on the 24th February, 1924, and returned on the 5th November, 1924. During the first part of the year he was in charge of the northern division and during the latter portion he was stationed at headquarters, Zomba.

Mr. R. G. ROSS TOWNSEND remained in charge of the southern division (headquarters Limbe) throughout the year.

In March the Secretary of State appointed Mr. P. TOPHAM, B.A. (Forestry), Cantab., as Forest Officer to fill the vacancy caused by the retirement of Mr. J. M. PURVES (Chief Forest Officer) in the previous year. Mr. TOPHAM was in charge of the northern division from June to the end of the year.

Mr. C. G. SEARLE, who had been employed in a temporary capacity since December, 1921, was appointed to be Forester on the 1st April, 1924. He was stationed at headquarters, Zomba, until proceeding on leave on the 12th October, 1924.

(c) *Native Staff*.—The native staff consisted of:—

11 Native foresters (some of whom are only partly trained).

58 Forest guards (many of whom were employed only during the latter half of the year).

3 Clerks, 1 third class, 2 learners (ungraded).

1 Messenger.

With the exception of a few guards employed in connection with plantations, Mlanje cypress forests, etc., the forest guards are under the direct control and supervision of the Residents of the Districts in which they are employed.

14.—LABOUR.

No difficulty was experienced in obtaining sufficient labour but there is no doubt that there would be difficulties should afforestation operations be undertaken on a considerably large scale in any one locality. One of the features of the year was the development and success of the cash-payment system for timber transport down Mlanje Mountain and it will be seen in para. II (1) that 3,019 loads of timber were transported by voluntary carriers.

15.—GENERAL.

(a) *Imports*.—Timber imports for the year were valued at £3,087 as compared with a value £3,535 in 1923, or with an average of £380 for the three years 1920 to 1922.

(b) *Exports*.—No timber was exported.

Beeswax was exported to the extent of 15,664 lbs. as compared with 11,113 lbs. in 1923.

6,488 lbs. of *Strophanthus* were exported during the year there having been no export of this forest product during 1922 and 1923. In 1921 the export was 13,577 lbs.

(c) *Advice on Tree-Planting, etc.*—Requests for advice on tree-planting continue to be numerous. A paper on the forest policy of the Protectorate was read by the Chief Forest Officer at a Forestry Conference held at Blantyre in March on the occasion of the visit to the Protectorate of Colonel Sutherland, C.B.E., Asst. Forestry Commissioner for Scotland.

(d) *Propaganda*.—Propaganda work amongst the native population has been carried out by forest officers wherever possible. This has included:—

(a) Explaining the important points in the forest laws.

(b) Pointing out the evil effect on water supplies of destroying forest growth in water-sheds, on steep hillsides, and along stream-banks.

(c) Urging villages to take steps for conserving local supplies of poles and fuel by a simple scheme of working a village forest area.

(d) Urging villages to undertake afforestation where local indigenous supplies are inadequate for their future requirements.

Many Administrative Officers are now doing valuable work in giving these forestry matters a prominent place in discussions with chiefs and headmen, and in doing everything possible in the interests of forest protection.

(e) *Publications*.—The Chief Forest Officer contributed an article on "the relation of forest vegetation to climate, water supply and soil erosion" to Bulletin No. 1 of 1924 published by the Department of Agriculture.

J. B. CLEMENTS, B.Sc.,
Chief Forest Officer.

APPENDIX 1.

FINANCIAL STATEMENT (1st April, 1923, to 31st March, 1924.)

EXPENDITURE.				RECEIPTS.			
	£	s.	d.		£	s.	d.
(a) Personal emoluments ...	2,401	1	11	1. <i>Cash Revenue.</i>			
(b) Travelling expenses ...	281	12	7	(a) Indigenous timber			
(c) Passages ...	239	4	11	(including poles)	721	2	7
(d) Afforestation ...	420	1	6	(b) do firewood ...	1,346	15	6
(e) Tools, seed, books, and				(c) Bamboos ...	70	2	8
incidentals ...	62	19	11	(d) Plantation timber			
				(including poles)	224	14	10
	£3,405	0	10	(e) do firewood ...	420	10	0
				(f) Grazing fees ...	179	18	8
				(g) Sale of plants and seed	178	13	9
					£3,141	18	0
				11. Value of forest produce			
				supplied to Government			
				Departments (exempted			
				from payment) ...	3,862	0	0
					£7,003	18	0
				The royalty value of the			
				estimated native con-			
				sumption of free forest			
				produce is about ...	£300,000	0	0

See para. 12 of Report.

APPENDIX II (See para. 12 of Report)

ANALYSIS OF FOREST REVENUE COLLECTED DURING FINANCIAL YEAR 1ST APRIL, 1923, TO 31ST MARCH, 1924.

Station.	Indigenous Produce.						Grazing Fees.	Plantation Produce.				Total.	Totals previous year 1922/23			
	Timber, including poles.		Firewood.		Bamboos.			Poles.		Firewood.				Sale of plants and seed.		
	£	s. d.	£	s. d.	£	s. d.		£	s. d.	£	s. d.	£			s. d.	
Zomba (C. F. O's Office)	445	14 7	893	9 7	46	2 4	40	2 9	224	0 4	420	10 0	2,224	4 7	1,354	2 3
Ft. Johnston (F. O., N. Divn.)	62	14 3	167	16 5	14	2 4	20	8 0	14	6	—	—	290	4 5	328	17 7
Port Herald, by Resident	36	16 1	36	19 6	2	6 3	40	13 0	—	—	—	—	116	14 10	191	18 0
Dowa	18	4 3	20	18 0	2	17 6	31	0 0	—	—	—	—	72	19 9	122	19 2
Ncheu	55	5 6	11	5 6	1	17 6	—	—	—	—	—	—	68	8 6	52	16 2
Dedza	16	14 8	33	5 0	7	6	15	12 7	—	—	—	—	65	19 9	80	2 9
Blantyre	19	16 3	33	15 0	—	—	—	—	—	—	—	—	53	11 3	27	17 9
Chiradzulu	2	1 8	42	9 0	—	—	—	—	—	—	—	—	44	10 8	13	5 0
Mlanje	3	0 3	30	3 0	—	—	—	—	—	—	—	—	33	3 3	18	13 8
Lilongwe	5	5 10	14	13 0	—	—	13	2 8	—	—	—	—	33	1 6	55	1 11
Kota Kota	3	1 5	20	2 6	0	7 6	7	1 0	—	—	—	—	30	12 5	17	10 0
Fort Manning	4	6 4	8	16 0	0	2 6	11	18 8	—	—	—	—	25	3 6	54	5 1
Liwonde	14	16 3	8	4 6	0	7 6	—	—	—	—	—	—	23	8 3	8	3 2
Chinteché	11	7 10	9	5 0	—	—	—	—	—	—	—	—	20	12 10	56	2 1
Mzimba	9	7 10	8	8 0	1	1 7	—	—	—	—	—	—	18	17 5	11	10 11
Chikwawa	9	5 1	4	5 6	0	10 0	—	—	—	—	—	—	14	0 7	Nil	Nil
Neno	3	4 6	0	12 0	—	—	—	—	—	—	—	—	3	16 6	—	—
Kasungu	—	—	1	4 0	—	—	—	—	—	—	—	—	1	4 0	—	—
Cholo	—	—	1	4 0	—	—	—	—	—	—	—	—	1	4 0	—	—
Totals ...	721	2 7	1,346	15 6	70	2 8	179	18 8	224	14 10	420	10 0	3,141	18 0	2,393	5 6

THE AGRICULTURAL CHEMIST.

The work continued from the following year was connected most largely with:—

1. Soil Survey of Nyasaland including field and laboratory investigations into the following soil types, with more especial reference to tobacco, tea, coffee and cotton:—

1. Likangala brown sandy loams.
2. Midima grey sandy soils.
3. Michiru and Lunzu loams.
4. Ntondwe red loams.
5. Tuanjati grey loams.
6. Cholo red soils.
7. Gravelly and alluvial soils of Shire valley.

The following districts have been visited for inspection of main soil types:—

Namweras, Liwonde, Ncheu, Dedza, Lilongwe.

2. Field experiments with tobacco, cotton, etc., investigating:—

- (a). Methods of drainage and combating soil erosion.
- (b). Rotations and manures for improving quality of tobacco.
- (c). Seed-bed soil; partial sterilization.
- (d). Diseases of tobacco and influence on quality.
- (e). Varieties of tobacco.

3. Advisory work on field crops including:

- (a). Visits to planters' Associations and individual estates.
- (b). Publication of bulletins and articles in *Nyasaland Times*.

4. Cattle Dips.

5. Milk.

6. Water Supplies.

7. Mineral and fertilizer analyses.

8. Poisons.

9. Miscellaneous investigations and preparation of chemicals required by the Entomologist and other departments.

In the absence of the Director of Agriculture on leave, I acted as Assistant Director.

1. SOIL SURVEY.

Bulletins have been published on the various soil types and advice given therein on the results of field and laboratory investigations. Naturally as the high-level lateritic soils are used for the production of our most important exports, these have received most attention. The very variable gravelly and alluvial soils of lower levels have also been investigated. Samples from sixty-one estates have been tested and relegated to the types. The samples have been fully analysed as reported in bulletins. The greatest difficulty in work on these high-level soils is the collection of samples which shall be truly representative of large areas and free from admixture with wash from the surrounding rock intrusions, collection at certain places of heavier minerals, and contamination by ashes and phosphates on sites of old native villages which may have moved many years ago after tribal warfare.

The fluctuations in the available nitrogen and lime of our soils during the growing period is being investigated. Experiments have proved the great benefit of applying nitrates and lime at correct periods of growth.

2. The greatest factor influencing the yield and quality of our crops is undoubtedly climatic, as the wet growing season and water-logging which often occurs, causes the widest fluctuation in the food available for growth of the plant and the resistance of the plant to diseases and pests. It is the aim of these soils investigations to correct these fluctuations. Moreover the clean cultivation on the slopes necessary with so many of our crops leads to a great loss of soil material unless steps are taken to prevent it. With these facts in mind, the use of drains as adjuncts to the adoption of graded ridge terraces have been advocated with tea and tobacco, and such drains, with a gentle gradient, the earth being thrown up above, have been successful on the steep tea gardens of Mlanje and certain tobacco soils, where the plough has not superseded hand cultivation.

(b). Manurial experiments to date have been reported in bulletins, and with the kind co-operation of the British Central Africa Company, the Blantyre and East Africa Company, the Imperial Tobacco Company and the A. L. Bruce Estates, rotation experiments with the use of manures, to cover a number of years have been started and it is hoped to show that great improvement in yield and quality of our crops can thereby be effected. It should be realized that with these lateritic soils containing much alumina and iron hydroxides and little lime it is not an economic possibility to correct the deficiencies in one year for produce of the best quality.

(c). So many of the troubles of our field crops start from the nurseries that investigations in sterilization more efficient than the average burning of the dry soil in September have been started. The correct state of dampness required if open fires are used has received attention. The cooking of a potato until the skin slips off easily at a three inch depth, as laid down by the American authorities, is a useful test in such sterilizing.

Chemicals which are started by investigators at Rothamsted to kill off noxious organisms such as protozoa and eelworm (causing galls on roots of tobacco), to stimulate useful bacteria and improve fertility are being tested. Di-nitro-chlor-benzene and cresylic acid are the principal ones under investigation.

(d). Further investigations on the bacterial diseases of tobacco have shown that the most prevalent and worst disease in this country is caused by a wide spread bacterium which is capable of forming spores very resistant to heat and dessication. In this respect it is different to *Bacterium angulatum*, the cause of angular leaf-spot in the United States, and this fact explains why it is capable of persisting over the dry season in certain places and why it is the chief disease in this country.

Bacterial leaf spot moreover may appear as black or brown markings in a leaf which has been put in the barn looking quite clean. Methods of curing to combat this form of "pole-burn" have been described and in the hands of experienced curers have been quite successful.

The influence of potash in minimising damage to the leaf by this spot has been reported in bulletins. Naturally the markings seriously detract from the value of the leaf.

(e). In the absence of the Assistant Director, some work was done on varieties of tobacco and a few pounds of seed were issued for trial. 50 lbs of seed were also cleaned in the laboratory.

3. One hundred and six estates have been visited in connection with advisory work and field experiments. It is encouraging to see, as the result of advisory and propaganda work, that more intensive methods such as spraying and manuring are being adopted. As the supply of labour diminishes, it is imperative that such methods should be adopted in a highly specialized business like tobacco growing, and I must pay tribute to the way in which my recommendations are carried out by most planters.

I have gained considerable insight into the growing of tobacco by natives and in my opinion this highly specialized business is not suitable for the majority. Too often in the production of a leaf which they must cure by sun or open-fire, they select unsuitable land, sow nurseries insufficient to "hit a season," and give the growing crop insufficient cultivation. Of the combating of pests and diseases they are entirely ignorant. It is obvious that very careful supervision is required if this industry should progress along the right lines, and if the country is not to become denuded in critical areas for the gardens of these natives or for timber for curing their crop.

The following bulletins have been published :

- No. 1 of 1921, Part 3. Erosion of arable soil.
- No. 2 of 1921, Likangala sandy loams.
- No. 1 of 1925, High level lateritic soils.

Parts 1 and 2 of No. 1 of 1924 were written by the Geologist and Chief Forest Officer respectively.

The following articles have also appeared in the *Nyasaland Times* :—

- Field Trials (3 parts)
- Nitrogen in Nyasaland soils and the growth of tobacco.
- Drains and Graded Ridge Terraces.
- Disinfection and germination of tobacco seed.
- Partial Sterilization of tobacco seed-bed soil.

Tobacco investigations have taken the form of ash analyses from the various types. The low lime-magnesia ratio of most Nyasaland tobaccos hitherto reported has not been confirmed, but these investigations are being continued.

A new solution has been prepared in large quantities from cheap chemicals and has proved quite successful for dipping animals in the Government tank at Zomba. A great saving is effected and materials are ordered for using it in all Government Tanks.

The usual supply of deci-normal iodine has been supplied to Veterinary Officers for testing dips.

Milk.—Samples tested show the usual high percentage of fat. The average of twelve samples gave 5.03 per cent. of butter-fat and 8.9 per cent. of solids not fat.

Water.—Six samples of water were received for examination. The following samples from boreholes 40 feet and 115 feet gave results respectively as follows :—

Reaction.	Limbi Alkline.	Blantyre Alkline.
Free and Saline Ammonia	·0034	·0026
Organic Ammonia	·0125	·004
Chlorine	·4	·75
Nitrous Nitrogen	nil	nil
Nitric "	·02	·047
Oxygen absorbed	·0132	·025
Total solids	17·0	21·0
Temporary hardness	9·25	15·5
Appearance on ignition	charring	very slight charring
Phosphates	least trace	crystalline silica
Microscopic examination of sediment	few crystals	crystalline silica

One other sample was quite satisfactory but three others showed contamination by the high figure for oxygen absorbed and numerous organisms in the sediment.

7.—FERTILIZERS, MINERALS, ETC.

The following were forwarded for analysis:—

Ammonium sulphate
Phosphate of Potash
Fertilizer mixture
Bauxite from Zomba mountain
Limestones from Port Herald, etc.
Manganiferous dolomite from Kangankunde
Pure dolomite from Port Herald
Food Concentrate.

The ammonium sulphate was quite satisfactory containing 25.1 per cent. ammonia, but the price paid was excessive. A unit price of 17/- should not be exceeded at Limbi and it would pay farmers if they paid strict attention to these prices.

The phosphate of potash contained 29.2 and 17.1 per cent respectively of water soluble phosphoric oxide and potash. The total percentages were 39.1 per cent. and 20.5 per cent respectively.

The fertilizer mixture contained 14.85 per cent. of ammonium sulphate, 81 per cent. of potassium sulphate and 4.6 per cent. of superphosphate of lime.

The reputed Bauxite contained 23 per cent. of silica. The dolomites and limestones form the subject of a separate paper, but it is interesting to note that a pure form of calcite has been found at Port Herald. The high percentage of magnesia in some limes prevents them being used on most soils.

The food concentrate was ground nut cake and contained percentages as follows:—

Ether extract ...	...	...	...	...	...	41.76
Albuminoid ...	...	...	...	...	...	37.10
Ash ...	...	...	...	...	...	4.46
Water ...	...	...	...	...	...	9.70
Crude fibre ...	...	...	...	...	...	4.10
Carbohydrates ...	...	...	...	...	...	2.88

This shows that the expression of oil had been very inefficient.

8.—POISONS.

In connection with investigations by the Chief Veterinary Officer, stomach contents from ten animals were forwarded for determination of arsenic.

In four cases only the usual trace was found but in the other cases over .06 milligrams was found in the stomach wall and contents, 30 grams being taken of each. This is, according to the Rhodesian Agricultural Department, far more than that found in the stomachs of healthy animals regularly dipped and it must be inferred that arsenical poisoning was the cause of death.

The following native plants, parts of plants and medicines have been forwarded for examination:—

Mkundi
Luvungwe
Milunga
Mwanandaline or Milindipiri
Chisongwe (*Ricinus communis*)
Chinyamibata
Manyeza
Ngunguzu
Yellow water containing Iron hydroxide

'Chisongwe' of course contains in the seeds the poisonous ricin and apparently the locally prepared castor oil prescribed by the native doctor had contained some of this compound.

'Milunga' twigs were found in the house of a man suspected of having poisoned another. The twigs were found to contain small quantities of an alkaloid and a rat fed on small quantities of the material died. Of course it is very difficult to prove in such a case that the medicine had actually been used by the man as no post-mortem had been carried out.

The remaining medicines although tried on small mammals and chemically examined yielded no evidence of a poisonous nature. Milindipire is used as a aphrodisiac.

9. Miscellaneous investigations dealt with:—

- the disposal of effluent from Sisal factories
- Poisoning of a plague of rodents on field cotton with barium carbonate bait.
- Preparation of cotton-boll extracts for the Entomologist.
- Preparation of stains and chemicals required by other departments, such as amly acetate and nitrobenzene.
- Determination of moisture in packed tobacco leaf.

Samples of tobacco were also collected with the kind permission of Mr. E. W. Howard of the Imperial Tobacco Company and of Mr. D. Humphrey of Nyungwe Estate, for the British Empire Exhibition.

A. J. W. HORNBY, B.Sc., A.I.C.

